



OneRTM: an online real-time modelling platform for the next generation of numerical environmental modelling

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Numerical modelling has been applied in many fields to better understand and predict the behaviours of different processes. In our increasingly dynamic world there is an imperative to identify potential stresses and threats in the environment and to respond quickly with sound decisions. However, the limitations in traditional modelling methodologies make it difficult to respond quickly to rapidly developing environmental events, such as floods, droughts and pollution incidents. For example, it is both time consuming and costly to keep model data up-to-date and also to disseminate models results and modelled output datasets to end-users. Crucially it is difficult for people who has limited numerical modelling skills to understand and interact with models and modelled results.

In response to these challenges, a proof-of-concept online real-time modelling platform (OneRTM) has been developed as a mechanism for maintaining and disseminating numerical models and datasets. This automatically keeps models current for the most recent input data, links models based on data flow; it makes models and modelled datasets (historic, real-time and forecasted) immediately available via the internet as easy-to-understand dynamic GIS layers and graphs; and it provides online modelling functions to allow non-modellers to manipulate model including running pre-defined scenarios with a few mouse clicks. OneRTM has been successfully applied and tested in the Chalk groundwater flow modelling in the Thames Basin, UK. The system hosts and links groundwater recharge and groundwater flow models in the case study area, and automatically publishes the latest groundwater level layers on the internet once the current weather datasets becomes available. It also provides online functions of generating groundwater hydrograph and running groundwater abstraction scenarios.

Although OneRTM is currently tested using groundwater flow modelling as an example, it could be further developed into a platform to host many kinds of time-variant environmental and socio-economic models to benefit decision makers, industries (such as water and insurance companies and precision agriculture activities) and researchers.